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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/799,505

03/11/2004

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EXAMINER

CHAWAN, VIJAY B

ART UNIT

PAPER NUMBER

2626

MAIL DATE

DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

**Application No.**

10/799,505

**Applicant(s)**

GAO, YANG

**Examiner**

Vijay B. Chawan

**Art Unit**

2626

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☒ Claim(s) 13-18 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |  |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                 | 5) <input type="checkbox"/> Notice of Informal Patent Application                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____  |

## **DETAILED ACTION**

### ***Allowable Subject Matter***

1. Claims 13-18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1 5, and 9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The term "close" is indefinite and fails to define what the term encompasses.

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Nishiguchi et al., (5,809,455).

As per claim 1, Nishiguchi et al., teach a method for suppressing background noise from a speech signal, said method comprising:

obtaining an input speech signal; performing linear predictive coding (LPC) analysis on said input speech signal to obtain a z-domain representation of said input speech signal (Fig.5, items 42 and 43);

computing a spectrum tilt and a noise-to-signal ratio (NSR) of said z-domain representation of said input speech signal; obtaining a spectrum tilt of a background noise model (Fig.5, items 34 and 65);

applying a gain to reduce energy of said input speech signal when said NSR is high (Fig.5, items 34 and 65) ;

reducing a spectral valley energy of said input speech signal when said spectrum tilt of said input speech signal is close or equivalent to said spectrum tilt of said background noise model (Col.11, line 49 – Col.12, line 27, Figs. 5 and 6);  
and

applying an inverse filter to said input speech signal when said spectrum tilt of said input speech signal is not close to said spectrum tilt of said background noise model, wherein said inverse filter is an inverse of said z-domain representation of said background noise model (Fig.13, items 125).

As per claim 2, Nishiguchi et al., teach the method of claim 1, wherein said input speech signal comprises a plurality of sub-frames processed in sequence (Fig.5, items 11, 12, 13, 15, 15', 16, 17, 17' and 19).

As per claim 3, Nishiguchi et al., teach the method of claim 1, wherein said gain is adaptively based on characteristics of said input speech (Fig.6,).

As per claim 4, Nishiguchi et al., teach the method of claim 1, wherein said background noise model is a first order model (Fig.6, item 64, Col.12, lines 58-64).

As per claim 5, Nishiguchi et al., teach a computer program product comprising: a computer usable medium having computer readable program code embodied therein for suppressing background noise from a speech signal;

said computer readable program code configured to cause a computer to: obtain an input speech signal; perform linear predictive coding (LPC) analysis on said input speech signal to obtain a z-domain representation of said input speech signal (Fig.5, items 42 and 43);

compute a spectrum tilt and a noise-to-signal ratio (NSR) of said z-domain representation of said input signal (Fig.5, items 34 and 65);

obtain a spectrum tilt of a background noise model; apply a gain to reduce energy of said input speech signal when said NSR is high (Col.11, line 49 – Col.12, line 27, Fig. 5, items 34 and 65);

reduce a spectral valley energy of said input speech signal when said spectrum tilt of said input speech signal is close or equivalent to said spectrum tilt

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of said background noise model (Col.11, line 49 – Col.12, line 27, Figs. 5 and 6);  
and

apply an inverse filter to said input speech signal when said spectrum tilt of said input speech signal is not close to said spectrum tilt of said background noise model, wherein said inverse filter is an inverse of said z-domain representation of said background noise model (Fig.13, item 125).

As per 6, Nishiguchi et al., teach the computer program product of claim 5, wherein said input speech signal comprises a plurality of sub-frames processed in sequence (Fig.5, items 11, 12, 13, 15, 15', 16, 17, 17' and 19).

As per 7, Nishiguchi et al., teach the computer program product of claim 5, wherein said gain is adaptively based on characteristics of said input speech (Fig.6).

As per 8, Nishiguchi et al., teach the computer program product of claim 5, wherein said background noise model is a first order model (Fig.6, item 64, Col.12, lines 58-64).

As per claim 9, Nishiguchi et al., teach an apparatus for suppressing background noise from a speech signal, said apparatus comprising:

an object for receiving an input speech signal; an object for performing linear predictive coding (LPC) analysis on said input speech signal to obtain a z-domain representation of said input speech signal (Fig.5, items 42 and 43);

an object for computing a spectrum tilt and a noise-to-signal ratio (NSR) of said z-domain representation of said input signal; an object for obtaining a spectrum tilt of a background noise model (Fig.5, items 34 and 65);

an object for applying a gain to reduce energy of said input speech signal when said NSR is high (Fig.5, items 34 and 65);

an object for reducing a spectral valley energy of said input speech signal when said spectrum tilt of said input speech signal is close or equivalent to said spectrum tilt of said background noise model (Col.11, line 49 – Col.12, line 27, Figs. 5 and 6); and

an object for applying an inverse filter to said input speech signal when said spectrum tilt of said input speech signal is not close to said spectrum tilt of said background noise model, wherein said inverse filter is an inverse of the z-domain representation of said background noise model (Fig.13, item 125).

As per claim 10, Nishiguchi et al., teach the apparatus of claim 9, wherein said input speech signal comprises a plurality of sub-frames processed in sequence (Fig.5, items 11, 12, 13, 15, 15', 16, 17, 17' and 19).

As per claim 11, Nishiguchi et al., teach the apparatus of claim 9, wherein said gain is adaptive based on characteristics of said input speech (Fig.6).

As per claim 12, Nishiguchi et al., teach the apparatus of claim 9, wherein said background noise model is a first order model (Fig.6, item 64, Col.12, lines 58-64).

### ***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See attached form PTO-892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vijay B. Chawan whose telephone number is (571) 272-7601. The examiner can normally be reached on Monday Through Friday 6:30-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (571) 272-7602. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Vijay B. Chawan  
Primary Examiner  
Art Unit 2626

vbc  
9/20/07

**VIJAY CHAWAN  
PRIMARY EXAMINER**